General

Guideline Title

PACES/HRS expert consensus statement on the management of the asymptomatic young patient with a Wolff-Parkinson-White (WPW, ventricular preexcitation) electrocardiographic pattern.

Bibliographic Source(s)

Cohen MI, Triedman JK, Cannon BC, Davis AM, Drago F, Janousek J, Klein GJ, Law IH, Morady FJ, Paul T, Perry JC, Sanatani S, Tanel RE, Pediatric and Congenital Electrophysiology Society (PACES), Heart Rhythm Society (HRS), American College of Cardiology Foundation (ACCF), American Heart Association (AHA), American Academy of Pediatrics (AAP), Canadian Heart Rhythm Society (CHRS). PACES/HRS expert consensus statement on the management of the asymptomatic young patient with a Wolff-Parkinson-White (WPW, ventricular preexcitation) electrocardiographic pattern. Heart Rhythm. 2012 Jun;9(6):1006-24. [158 references] PubMed

Guideline Status

This is the current release of the guideline.

Recommendations

Major Recommendations

Definitions of levels of evidence (A-D) and classification of recommendations (I, II, IIa, IIb, III) are provided at the end of the "Major Recommendations" field.

Recommendations for Young Asymptomatic Patients (8–21 years) with Wolff-Parkinson-White (WPW) Electrocardiographic (ECG) Pattern*,†

1. An exercise stress test, when the child is old enough to comply, is a reasonable component of the evaluation if the ambulatory ECG exhibits persistent preexcitation (Class IIA, Levels of Evidence B/C). In patients with clear and abrupt loss of preexcitation at physiological heart rates, the accessory pathway properties pose a lower risk of sudden death. In children with subtle preexcitation the ECG and exercise test may be difficult to interpret.
2. Utilization of invasive risk stratification (transesophageal or intracardiac) to assess the shortest preexcited R-R interval (SPERRI) in atrial fibrillation is reasonable in individuals whose noninvasive testing does not demonstrate clear and abrupt loss of preexcitation (Class IIA, Levels of Evidence B/C).†
3. Young patients with a SPERRI ≤250 ms in atrial fibrillation are at increased risk for sudden cardiac death (SCD). It is reasonable to consider catheter ablation in this group, taking into account the procedural risk factors based on the anatomical location of the pathway (Class IIA, Levels of Evidence B/C).
4. Young patients with a SPERRI >250 ms in atrial fibrillation are at lower risk for SCD, and it is reasonable to defer ablation (Class IIA, Level of Evidence C). Ablation may be considered in these patients at the time of diagnostic study if the location of the pathway and/or patient characteristics do not suggest that ablation may incur an increased risk of adverse events, such as atrioventricular (AV) block or

coronary artery injury (Class IIB, Level of Evidence C).

5. Young patients deemed to be at low risk might subsequently develop cardiovascular symptoms such as syncope or palpitations. These patients should then be considered symptomatic and may be eligible for catheter ablation procedures regardless of the prior assessment.
6. Asymptomatic patients with a WPW ECG pattern and structural heart disease are at risk for both atrial tachycardia and AV reciprocating tachycardia, which may result in unfavorable hemodynamics. Ablation may be considered regardless of the anterograde characteristics of the accessory pathway (Class IIB, Level of Evidence C).
7. Asymptomatic patients with a WPW ECG pattern and ventricular dysfunction secondary to dyssynchronous contractions may be considered for ablation, regardless of anterograde characteristics of the bypass tract (Class IIB, Level of Evidence C).
8. Asymptomatic patients with a WPW ECG pattern may be prescribed attention deficit hyperactivity disorder (ADHD) medications. This recommendation follows the American Heart Association Guidelines, which state that ADHD medications may be used in this setting after cardiac evaluation and with intermittent monitoring and supervision of a pediatric cardiologist (Vetter et al., 2008).

*Children ages 5–8 years may be placed in the "younger-observe" or "older-assess risk" categories based on provider preference and the specifics of the individual patient and his/her family.

†In the absence of inducible atrial fibrillation, the shortest preexcited inter-beat (R-R) interval determined by rapid atrial pacing is a reasonable surrogate.

Definitions:

Classification of Recommendations

- Class I: Conditions for which there is evidence and/or general agreement that a given procedure or treatment plan is beneficial, useful, and effective.
- Class II: Conditions for which there is conflicting evidence and/or divergence of opinion about the usefulness/efficacy of a procedure or treatment.
    - Class IIa: Weight of evidence/opinion is in favor of usefulness/efficacy.
    - Class IIb: Usefulness/efficacy is less well established by evidence/opinion.
- Class III: Conditions for which there is conflicting evidence and/or general agreement that a procedure or treatment is not useful/effective and in some cases may be harmful.

Level of Evidence

- Level of Evidence A: Data derived from multiple randomized clinical trials or meta-analyses
- Level of Evidence B: Data derived from a single randomized trial or nonrandomized studies
- Level of Evidence C: Only consensus opinion of experts, case studies, or standard of care
- Level of Evidence D: Expert opinion without studies

Clinical Algorithm(s)

The original guideline document contains a management algorithm.

Scope

Disease/Condition(s)

Asymptomatic Wolff-Parkinson-White (WPW) syndrome (abnormal electrocardiographic pattern of ventricular preexcitation without symptoms)

Guideline Category

Evaluation

Management

Risk Assessment

Treatment

Clinical Specialty

Cardiology

Pediatrics

Intended Users

Physicians

Guideline Objective(s)

To provide up-to-date clinical practice guidelines on the evaluation and management of the asymptomatic young patient with a Wolff-Parkinson-White (WPW) electrocardiographic (ECG) pattern

Target Population

Asymptomatic young patients between 8 and 21 years of age with a Wolff-Parkinson-White (WPW, ventricular preexcitation) electrocardiographic pattern

Note: Although this document does discuss symptomatic patients with WPW, it does so in the construct of establishing a framework into the historical armamentarium of noninvasive and invasive studies that have been utilized for risk assessment. This document does not address management strategies for symptomatic patients with WPW.

Interventions and Practices Considered

Evaluation/Risk Assessment

1. Baseline electrocardiogram (ECG)
2. Exercise stress test
3. Invasive risk stratification (transesophageal or intracardiac electrophysiologic study)

Management/Treatment

1. Catheter ablation based on shortest preexcited R-R interval (SPERRI) in atrial fibrillation, presence or absence of supraventricular tachycardia, and other patient characteristics
2. Use of attention deficit hyperactivity disorder (ADHD) medications after cardiac evaluation and with intermittent monitoring and supervision of a pediatric cardiologist

Major Outcomes Considered

- Risk of symptoms or sudden cardiac death (SCD)
- Risks and benefits of invasive procedures

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

An extensive literature search was performed. The committee also reviewed documents related to the subject matter as previously published by the Heart Rhythm Society (HRS), the American College of Cardiology (ACC), the American Heart Association (AHA), and the European Heart Rhythm Association (EHRA). The committee reviewed and ranked evidence supporting current recommendations based on a standard process as previously described and summarized (*Methodology Manual and Policies from the ACCHF and AHA Task Force on Practice Guidelines June 2010*).

Medline and PubMed databases were searched. All initial literature searches were performed at the time the document writing committee was initiated in January of 2011. Subsequent literature searches were performed as needed throughout document development and concluded in May of 2011. All randomized and observational studies in humans were included in literature searches. An initial search term of Wolff-Parkinson-White was used; each section author was responsible for adding search criteria relevant to their section.

Number of Source Documents

Not stated

Methods Used to Assess the Quality and Strength of the Evidence

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Level of Evidence

- Level of Evidence A: Data derived from multiple randomized clinical trials or meta-analyses
- Level of Evidence B: Data derived from a single randomized trial or nonrandomized studies
- Level of Evidence C: Only consensus opinion of experts, case studies, or standard of care
- Level of Evidence D: Expert opinion without studies

Methods Used to Analyze the Evidence

Review of Published Meta-Analyses

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

The writing committee members were tasked with performing a formal literature review and then weighing the strength of the evidence for or against an observational strategy or a particular procedure in the evaluation and management of asymptomatic patients with a Wolff-Parkinson-White (WPW) electrocardiographic (ECG) pattern (isolated ventricular preexcitation).

The committee was divided into subgroups to best review key aspects of the evaluation and management of WPW. These sections included detailed reviews and assessments of (1) natural history, (2) noninvasive risk stratification, (3) invasive risk stratification, (4) risks of ablation, (5) WPW and congenital heart disease, and (6) WPW and attention-deficit/hyperactivity disorder. For purposes of this consensus statement the committee defined asymptomatic WPW as individuals without any cardiovascular complaints (chest pain, palpitations, presyncope, and/or syncope) or documented tachycardia.

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Writing committee members were selected by the Pediatric and Congenital Electrophysiology Society (PACES) or Heart Rhythm Society (HRS) based on their expertise in the field. The 11 pediatric electrophysiologists on the writing committee included representatives from the United States, Canada, Australia, and Europe.

The recommendations listed in this document are, whenever possible, evidence-based. For the purposes of this document, "consensus" is defined as 75% or greater agreement by the writing members.

Rating Scheme for the Strength of the Recommendations

Classification of Recommendations

- Class I: Conditions for which there is evidence and/or general agreement that a given procedure or treatment plan is beneficial, useful, and effective.
- Class II: Conditions for which there is conflicting evidence and/or divergence of opinion about the usefulness/efficacy of a procedure or treatment.
    - Class IIa: Weight of evidence/opinion is in favor of usefulness/efficacy.
    - Class IIb: Usefulness/efficacy is less well established by evidence/opinion.
- Class III: Conditions for which there is conflicting evidence and/or general agreement that a procedure or treatment is not useful/effective and in some cases may be harmful.

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

Internal Peer Review

Description of Method of Guideline Validation

The original guideline document was reviewed by the executive committee within the Pediatric and Congenital Electrophysiology Society (PACES), none of whom were on the writing committee, as well as by additional members of Heart Rhythm Society (HRS). All writing members approved the final version. The writing committee thanks all reviewers for their comments and suggestions, many of which were incorporated into the final manuscript.

Evidence Supporting the Recommendations

References Supporting the Recommendations

Vetter VL, Elia J, Erickson C, Berger S, Blum N, Uzark K, Webb CL, American Heart Association Council on Cardiovascular Disease in the Young, American Heart Association Council on Cardiovascular Nursing. Cardiovascular monitoring of children and adolescents with heart disease receiving medications for attention deficit/hyperactivity disorder [corrected]: a scientific statement from the American Heart Association [trunc]. Circulation. 2008 May 6;117(18):2407-23. PubMed

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for selected recommendations (see the "Major Recommendations" field).

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

Appropriate evaluation and management of the asymptomatic young patient with a Wolff-Parkinson-White (WPW) electrocardiographic (ECG) pattern

Potential Harms

Risks and Complications of Invasive Electrophysiologic (EP) Studies

In two large studies focusing on >1300 adult patients, complications related to EP procedures included venous thrombosis (1%), pulmonary emboli (0.3%–1.6%), thrombophlebitis (0.6%), infection (0.8%), and catheter-induced permanent complete atrioventricular (AV) block (0.1%). All EP studies, transesophageal or intracardiac, may result in induction of ventricular fibrillation (VF), even in those who are asymptomatic. The amount of radiation exposure for a diagnostic EP catheterization is relatively small but needs to be taken into context in patients who have other sources of radiation exposure. Radiation exposure generally is avoided by the use of transesophageal pacing.

Risks and Complications of Catheter Ablation Therapy

- Serious adverse events attributed to catheter ablation are AV block, cardiac perforation, coronary artery involvement, and thromboembolic events. Early registry studies reported an overall complication rate of 3.2% using a very inclusive definition of adverse events, which lumped major and minor events. Second- or third-degree AV block occurred in 0.7% and thrombus formation or thromboembolic event occurred in 0.3%. The PAPCA study reported a complication rate of 4.0% (based on the EP study and the radiofrequency ablation [RFA]) and included no deaths. Right bundle branch block was reported in 0.5%, left bundle branch block in 0.1% of patients, and valvular regurgitation in 0.3% of patients. Hematoma at the catheter entry site was the most common complication reported (1.4%). AV block occurred in 0.9% of patients with manifest accessory pathways, but only in patients with a right or left septal pathway.
- Death has been reported as a complication of pediatric RFA due to cardiac perforation, myocardial trauma, coronary or cerebral thromboembolism, and ventricular arrhythmia.
- Radiation exposure during fluoroscopy is important to consider when recommending catheter ablation therapy. Fluoroscopy times can be particularly lengthy during technically challenging procedures, such as those involving a right lateral free wall accessory pathway.

Refer to the "Risks and Complications" section of the original guideline document for additional information on catheter ablation.

Qualifying Statements

Qualifying Statements

For the specific purpose of this statement, the young patient is defined as being between 8 and 21 years of age, an age span routinely cared for by pediatricians and pediatric cardiologists and generally considered old enough to undergo exercise testing and catheter ablation if indicated. A specific care plan for a particular patient must be made by the health care provider, the patient, and his or her parents after careful consideration and a thorough discussion of patient characteristics that impact on risks and benefits.

Implementation of the Guideline

Description of Implementation Strategy

An implementation strategy was not provided.

Implementation Tools

Clinical Algorithm

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Living with Illness

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

Cohen MI, Triedman JK, Cannon BC, Davis AM, Drago F, Janousek J, Klein GJ, Law IH, Morady FJ, Paul T, Perry JC, Sanatani S, Tanel RE, Pediatric and Congenital Electrophysiology Society (PACES), Heart Rhythm Society (HRS), American College of Cardiology Foundation (ACCF), American Heart Association (AHA), American Academy of Pediatrics (AAP), Canadian Heart Rhythm Society (CHRS). PACES/HRS expert consensus statement on the management of the asymptomatic young patient with a Wolff-Parkinson-White (WPW, ventricular preexcitation) electrocardiographic pattern. Heart Rhythm. 2012 Jun;9(6):1006-24. [158 references] PubMed

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2012 Jun

Guideline Developer(s)

Heart Rhythm Society - Professional Association

Source(s) of Funding

Heart Rhythm Society

Guideline Committee

Task Force

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Financial Disclosures/Conflicts of Interest

See Appendix Tables 11 and 12 of the original guideline document for author and peer reviewer disclosures.

Guideline Endorser(s)

American Academy of Pediatrics - Medical Specialty Society

American College of Cardiology Foundation - Medical Specialty Society

American Heart Association - Professional Association

Canadian Heart Rhythm Society - Professional Association

Guideline Status

This is the current release of the guideline.

Guideline Availability

Electronic copies: Available from the Heart Rhythm Society (HRS) Web site .

Availability of Companion Documents

The following is available:

- The HRS policy for development and endorsement of clinical guidance documents from HRS and others. Washington (DC): Heart Rhythm Society (HRS); 2009 Sep. 6 p. Available from the Heart Rhythm Society Web site .

Patient Resources

None available

NGC Status

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